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The natives in northwest Georgia commonly call *R. glabra* "red sumac" and *R. copallina* "black sumac," doubtless on account of the difference in color of the fruit.

ILEX MYRTIFOLIA Walt.

In the swamp of the Suwannee River (rather an unusual habitat for it) in Clinch County I noticed in February, 1904, some specimens of this handsome little tree about thirty feet tall, with trunks a foot in diameter, though this species has not hitherto been recognized as a member of our sylva. During the same winter and following spring I noticed other arborescent specimens of it, in pine-barren ponds, in Sumter, Berrien, Lowndes, Clinch, Ware, and other counties in the coastal plain.

A characteristic feature of this species is that its trunk is never strictly erect, but always ascending or curved.

STAPHYLEA TRIFOLIA L.

This too does not seem to have ever been credited with becoming a tree. On January 7, 1904, I found one specimen on the right bank of the Etowah River in Floyd County about four miles above Rome, on the Knox Dolomite (Lower Silurian) formation, which had a straight erect trunk five or six inches in diameter, with the lowest branches about six feet from the ground. There were a few shrubby specimens of it near by, but apparently no other arborescent one.

Specimens of these four little trees formed part of Georgia's exhibit at St. Louis last year, and are now presumably in the forestry collection in the state capitol in Atlanta.

COLLEGE POINT, NEW YORK.

COTYLEDON- AND LEAF-STRUCTURE IN CERTAIN RANUNCULACEAE

BY NEATA CLARK

This paper covers a brief study of the leaves and cotyledons of four of the *Ranunculaceae*, viz.: *Aquilegia coerulea* James, *Anemone multifida* Poir., *Pulsatilla hirsutissima* (Pursh) Britton,

and *Oxygraphis Cymbalaria* (Pursh) Prantl. The work was done at the suggestion of Professor Francis Ramaley.

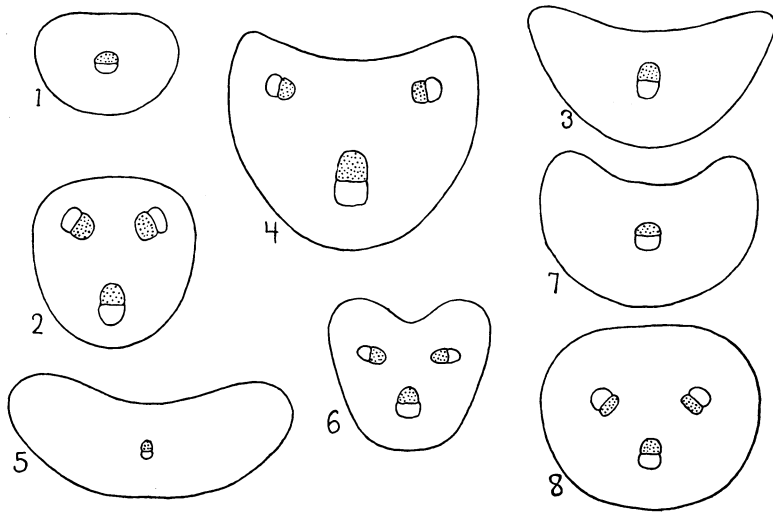
The cotyledons in the four species examined are all more or less ovate in outline, being of the usual Ranunculaceous type. The leaves in the first three species are much cut and divided while in *Oxygraphis* they are cordate-ovate with much branched veins. In no case does the cotyledon resemble the leaf in form. In *Oxygraphis Cymbalaria* the cotyledon-stalks are connate from their bases almost to the blades.

No constant difference of striking character was noticed in the epidermis of cotyledons and leaves. However, it was seen that the number of stomata was much smaller for a given area of cotyledon than for a similar area of leaf surface. No stomata were seen in the upper epidermis of either leaf or cotyledon of *Aquilegia coerulea*. "Twin stomata," *i. e.*, stomata in contiguous pairs, were seen in the lower epidermis of both leaf and cotyledon in this species. In the literature at hand there seems to be no mention of this peculiarity as having been noted in Ranunculaceae. Long, simple hairs occur on the under surface of the cotyledon of *Pulsatilla hirsutissima* and on both surfaces of the leaf.

In the internal structure of leaf and cotyledon the one-row palisade is characteristic of all, the single exception is the cotyledon of *Oxygraphis* in which the palisade might be described as two-layered. The spongy tissue of the cotyledons corresponds to that of the leaves, especially in the shape of the cells and in the size of the air-spaces. The vertical sections, excepting in *Pulsatilla hirsutissima*, showed about the same thickness, but in that species the cotyledon was about twice as thick as the leaf. This difference in thickness is brought about by the greater size of the cells in the cotyledon.

The leaf-petioles are quite different from the cotyledon-stalks in the four species. Figures 1 to 8, which are diagrams of cross-sections, show these differences plainly. In each case the leaf-petiole is somewhat cylindrical with about three vascular bundles while the cotyledon-stalk is more flattened and has only a single small bundle. Figures 1 and 2 are of *Aquilegia coerulea*, figures

3 and 4 are of *Anemone multifida*, figures 5 and 6 are of *Pulsatilla hirsutissima* and figures 7 and 8 are of *Oxygraphis Cymbalaria*. As above noted, the cotyledon-stalks in the last-named species are connate for nearly their entire length. This species should, therefore, be added to the list * published by Miss Sar-



FIGS. 1-8. Sketches illustrating cotyledon- and leaf-structure in *Aquilegia*, *Anemone*, *Pulsatilla*, and *Oxygraphis*.

gant, of plants in which the cotyledon-stalks form a petiolar tube.

On the whole, it may be said that while there are slight differences in the epidermis of cotyledons and leaves and in their internal structure, yet the greatest differences are in the leaf-petioles and cotyledon-stalks. The differences, recorded here for these species of Ranunculaceae, are on the whole, much the same as those previously noted in other plants by Ramaley.†

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* *Annals of Botany* 17 : 73. 1903.

† *Minn. Bot. Studies* 2 : 417. 1900; also, *University of Colorado Studies* 2 : 255. 1905.